1   13. RIPARIAN RESTORATION AND MANAGEMENT – [MODERATE]

- To create cover, stabilize banks, improve water quality, shade out in-channel reed canary grass, provide long-term source of large woody material.
- Refer to PHS Riparian document and Planting and Erosion Control Appendix of ISPG.

1.1   Introduction

1.1.1   Description of Technique

- Riparian fencing
- Livestock Exclusion
- Rest Rotation of Livestock
- Off Site Livestock Watering
- Supplemental Planting
- Foot traffic control
- Noxious weed control

Physical and Biological Effects

- Riparian Plant Establishment and Growth Patterns
- Riparian Habitat Diversity Capable of Supporting a Diverse Community of Fish and Wildlife
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- Depth to Groundwater
- Soil Compaction
- Soil Fertility
- Shading to lower water temperature and to shade out competing weed species
- Large and fine woody material recruitment
- Bank stability
- Near-bank cover
- Improve water quality (temperature, sediment, nutrients, dissolved oxygen, etc)
- High flow refuge
- Uptake, storage and release of nutrients to the stream
- Discuss fact that results are not immediate but they are long-lived

1.1.2 Application of Technique

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- Discuss types of situations when this technique could be used alone vs. in combination with other techniques
- This technique generally requires maintenance for first few years.   A commitment to maintenance should be made before applying this technique, especially when it is used as a stand alone treatment.
- Arid vs humid environment
- Limited to sites capable of supporting vegetation and with land use compatible with long-term vegetation establishment –consider golf course, utility, and other maintenance crews that might mow it down

Scale

- Channel fringe
- Riparian corridor
- Single site vs. entire stream reach

1.2   Risk and Uncertainty

- Biological Site Factors - uncertainty
- Physical Site Factors - uncertainty

1.3   Data Collection and Assessment

- Site Topography
- Hydrology
- Depth to Groundwater
- Soils
- Potential Site Constraints
- Climate
- Elevation
- Reference site (what's growing well elsewhere in similar site conditions)
- Data concerning livestock for grazing management purposes
- Site Potential – Assessment of Appropriate Plant Community

Methods and Design

- Reference Grazing Management Strategies
- Understand Natural Riparian Plant Processes
- Plant Materials
- Plant Communities
- Native vs non-native plants
- Species Selection
- Planting Layout and Density
- Site preparation
- Immediate protection from browse, trampling, and plant competition

1.4 Project Implementation

1.4.1 Permitting

No need for Permits

1.4.2 Construction

- Planting Methods/ Planting Equipment
- Timing
- Sequencing
- Care/Watering

1.4.3 Cost Estimation

- Planting Costs
- Fencing Costs
- Alternative water source development costs
- Address long-term maintenance in costs (e.g., initial cost may be higher if plant tubes are purchased and installed but long-term maintenance may be less)

1.4.4 Monitoring and Tracking

Define monitoring objectives. Consider need to collect overall site vs. species specific information. Consider benefit of comparing plant survival and growth when various site preparation techniques and plant protection methods are employed (especially on challenging sites). Consider need for quantitative vs qualitative data.

Depending on objectives, monitoring may include:

- Plant Survival/Succession
- Growth Rate
- Shade Provided to Stream
- Water Quality
- Threats to Project Success
- Livestock Use Monitoring
- Photo Points

1.4.5 Contracting Considerations

- Volunteer Crews
- Contracted Crew
- Experience level
- Fit-in-field adjustments

1.5 Operations and Maintenance

- Duration/Frequency
- Browse Protection
- Replanting
- Fence Repair
- Weed suppression
- Watering

1.6 Examples

Can WDFW provide examples? Inter-Fluve does not have any Washington examples.

1.7 References
References cited in this technique so it is a stand-alone pullout.

1.8 Photo and Drawing File Names
List filenames and file locations of any photos and drawing files associated with this technique